

ABSTRACT

Devices and methods are provided for separation of particles of a first selected electrophoretic mobility or isoelectric point from a fluid comprising particles of at least one other selected electrophoretic mobility or isoelectric point. The devices comprise a microchannel comprising an inlet for introducing the fluid into the microchannel; electrodes to either side of the microchannel for applying a selected voltage to produce an electrical field across the microchannel orthogonal to the length of the microchannel; and outlets in said microchannel placed to receive outlet portions of the fluid containing enhanced concentrations of each type of particle. The devices may be used for particle detection, quantification, separation, mixing, dilution and concentration. Electrophoretic tags may be used to provide particles with altered electrophoretic mobilities and/or isoelectric points. Interior particles of cells or organisms may be released, separated and detected by these devices and methods. The devices and methods may be used to separate particles such as proteins and microorganisms from biological fluids such as blood, or to separate and detect airborne contaminants such as bacterial warfare agents from air. The devices and methods may be included in devices including other separation and detection methods.